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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,603	01/12/2004	Srinath Hosur	TI-36366	9552

23494 7590 07/13/2007		EXAMINER
TEXAS INSTRUMENTS INCORPORATED		REGO, DOMINIC E
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DALLAS, TX 75265	ART UNIT	PAPER NUMBER
	2618	

NOTIFICATION DATE	DELIVERY MODE
07/13/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/755,603	HOSUR ET AL.
	Examiner	**Art Unit**	
	Dominic E. Rego	2618	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *24 April 2007*.

2a) ☒ This action is **FINAL**.　　2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-24* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-24* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a) ☐ All　b) ☐ Some * c) ☐ None of:

　　　1. ☐ Certified copies of the priority documents have been received.

　　　2. ☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ :

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2.   Claims 1-3,5-6,9-11,13-14,17-19, and 21-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 1,9,and 17, there is no mention of "wherein at least one of said first preamble and said second preamble employs a complete or an undivided training sequence". Regarding claims 2-3,5-6,10-11,18-19, and 21-22, there is no mention of "complete or undivided training sequence".

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-3,7-11,15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suh et al. (US Patent Application Publication #2004/0136464).

Regarding claim 1, as best understood in 112 1st paragraph, Suh teaches a

time-switched preamble generator for use with a multiple-input, multiple-output (MIMO)

transmitter employing first and second transmit antennas (Figure 5, first and second

transmit antennas are 527 and 539), comprising:

an initial preamble formatter configured to provide a first preamble to said first

transmit antenna *(Claim 7, Suh teaches generating a first preamble sequence in which*

odd data of the preamble sequence becomes null data and even data of the preamble

sequence becomes data, the first preamble sequence being adapted to be transmitted

via the first of the two antennas for one OFDM symbol period) and a second preamble

to said second transmit antenna during an initial time interval *(Claim 7, Suh teaches*

generating a second preamble sequence in which the even data of the preamble

sequence becomes null data and the odd data of the preamble sequence becomes

data, the second preamble sequence being adapted to be transmitted via the second of

the two antennas for the one OFDM symbol period); and

a subsequent preamble formatter coupled to said initial preamble formatter and

configured to provide said second preamble to said first transmit antenna *(Claim 7, Suh*

teaches generating the first preamble sequence in which odd data of the preamble

sequence becomes null data and even data of the preamble sequence becomes data,

the first preamble sequence being adapted to be transmitted via the second of the two

antennas for a next OFDM symbol period after passage of the one OFDM symbol

period) and said first preamble to said second transmit antenna during a subsequent

time interval *(Claim 7, Suh teaches generating the second preamble sequence in which the even data of the preamble sequence becomes null data and the odd data of the preamble sequence becomes data, the second preamble sequence being adapted to be transmitted via the first of the two antennas for the next OFDM symbol period)*, except for wherein at least one of said first preamble and said second preamble employs a complete training sequence.

However, in same art, Suh teaches wherein at least one of said first preamble and said second preamble employs a complete training sequence (Paragraphs 0062-0070).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the above teaching of Suh, in order to provide both increased robustness and capacity.

Regarding claim 2, as best understood in 112 1st paragraph, Suh teaches the generator wherein said first preamble employs <u>said complete</u> training sequence and said second preamble employs a null *(Claim 7; Paragraphs 0062-0070: Suh teaches a preamble sequence generator 517 generates a corresponding preamble sequence and provides the generates preamble sequence (complete training sequence) to the selector 519).*

Regarding claim 3, as best understood in 112 1st paragraph, Suh teaches the generator wherein said <u>complete</u> training sequence occurs during said null *(Claim 7; Paragraphs 0037- 0038).*

Regarding claim 7, Sue teaches the generator wherein at least one of said first and second preambles employs a guard interval (Paragraphs 0010, 0013,0078, and 0087).

Regarding claim 8, Sue teaches the generator wherein said initial and subsequent time intervals are contiguous (Claim 7).

5.   Claims 9-16 are rejected for the same reason as set forth in claims 1-8 and claim 18-24 are rejected for the same reason as set forth in claims 2-8.

6.   Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suh et al. (US Patent Application Publication #2004/0136464) in view of Nakao et al. (US Patent Application Publication #2002/0057750).

Regarding claim 4, Suh teaches the generator wherein said null is selected from the group consisting of: a null sequence; a zero function (Paragraphs 0037 and 0078), except for an un-modulated transmission.

However, in related art, Nakao teaches the generator wherein said null is selected from the group consisting of: an un-modulated transmission (Paragraph 0011).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the above teaching of Nakao to Suh for the synchronism processor 8 is capable of detecting a synchronism timing by detecting the level of NULL symbols (Nakao, Paragraph 0011).

7.   Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Suh et al. (US Patent Application Publication #2004/0136464) in view of Li et al. (US

Patent #7,110,350).

Regarding claim 5, as best understood in 112 1st paragraph, Suh teaches all

the claimed elements in claim 1, except for the generator wherein said first preamble

employs a complete first training sequence and said second preamble employs a

complete second training sequence orthogonal to said complete first training sequence.

However, in related art, Li teaches the generator wherein said first preamble

employs a complete first training sequence and said second preamble employs a

complete second training sequence orthogonal to said complete first training sequence

(See claim 10; Paragraphs 0062-0072).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention was made to use the above teaching of Li to Suh in order to

achieve higher data transmission rates for wireless communication systems over

multipath-rich wireless channels (Li, Col 1, lines 55-59).

Regarding claim 6, as best understood in 112 1st paragraph, the combination

of Suh and Li teach all the claimed elements in claim 5. In addition, Li teaches the ·

generator wherein said complete first training sequence employs a subset of tones and

said <u>complete</u> second training sequence employs a remaining subset of tones (Col 5,

lines 18-38).

Regarding claim 17, as best understood in 112 1st paragraph, Suh teaches a

multiple-input, multiple-output (MIMO) communication system, comprising:

first and second transmitters employing first and second transmit antennas,

respectively (Figure 5, first and second transmit antennas are 527 and 539);

a time-switched preamble generator coupled to said first and second

transmitters, including:

an initial preamble formatter that provides a first preamble to said first transmit

antenna *(Claim 7, Suh teaches generating a first preamble sequence in which odd data*

of the preamble sequence becomes null data and even data of the preamble sequence

becomes data, the first preamble sequence being adapted to be transmitted via the first

of the two antennas for one OFDM symbol period) and a second preamble to said

second transmit antenna during an initial time interval *(Claim 7, Suh teaches generating*

a second preamble sequence in which the even data of the preamble sequence

becomes null data and the odd data of the preamble sequence becomes data, the

second preamble sequence being adapted to be transmitted via the second of the two

antennas for the one OFDM symbol period), and

a subsequent preamble formatter coupled to said initial preamble formatter that

provides said second preamble to said first transmit antenna *(Claim 7, Suh teaches*

generating the first preamble sequence in which odd data of the preamble sequence

becomes null data and even data of the preamble sequence becomes data, the first

preamble sequence being adapted to be transmitted via the second of the two antennas

for a next OFDM symbol period after passage of the one OFDM symbol period) and

said first preamble to said second transmit antenna during a subsequent time interval

(Claim 7, Suh teaches generating the second preamble sequence in which the even

data of the preamble sequence becomes null data and the odd data of the preamble

sequence becomes data, the second preamble sequence being adapted to be

transmitted via the first of the two antennas for the next OFDM symbol period), except

for wherein at least one of said first preamble and said second preamble employs

undivided training sequence.

However, in same art, Suh teaches wherein at least one of said first preamble

and said second preamble employs undivided training sequence (Paragraphs 0062-

0070).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention was made to use the above teaching of Suh, in order to provide

both increased robustness and capacity.

Suh also fails to teach first and second receivers, associated with said first and

second transmitters, that employ first and second receive antennas, respectively.

However, in related art Li teaches first and second receivers, associated with

said first and second transmitters, that employ first and second receive antennas,

respectively (Col 4, lines 11-25 and Figure 1, elements 140 and 150).

Therefore, it would have been obvious to one of ordinary skill in the art at the

time of the invention was made to use the teaching of first and second receivers,

associated with said first and second transmitters, that employ first and second receive

antennas, respectively, as taught by Li, in the Suh device in order to transmit and
receive signal.

Response to Arguments

8.   Applicant's arguments with respect to claims 1-24 have been considered but are
moot in view of the new ground(s) of rejection.

Conclusion

9.   Applicant's amendment necessitated the new ground(s) of rejection presented in
this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP
§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37
CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE
MONTHS from the mailing date of this action. In the event a first reply is filed within
TWO MONTHS of the mailing date of this final action and the advisory action is not
mailed until after the end of the THREE-MONTH shortened statutory period, then the
shortened statutory period will expire on the date the advisory action is mailed, and any
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of
the advisory action. In no event, however, will the statutory period for reply expire later
than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Dominic E. Rego whose telephone number is 571-272-
8132. The examiner can normally be reached on Monday-Friday, 8:30 am-5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nay Maung can be reached on 571-272-7882. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dominic E. Rego
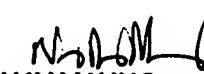
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